## (19) World Intellectual Property Organization

International Bureau



## - 1 1241 A 1111 AND TO BERKE HERE BERKE BERKE BERKE 1 14 101 AVEN BERKE BERKE BERKE BERKE BERKE BERKE BERKE BER

(43) International Publication Date 9 December 2004 (09.12,2004)

**PCT** 

## (10) International Publication Number WO 2004/107454 A1

(51) International Patent Classification<sup>7</sup>: 29/07

H01L 29/872,

(21) International Application Number:

PCT/IB2004/050765

(22) International Filing Date: 25 May 2004 (25.05.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 03101538.1

27 May 2003 (27.05.2003) EF

- (71) Applicant (for DE only): PHILIPS INTELLECTUAL PROPERTY & STANDARDS GMBH [DE/DE]; Steindamm 94, 20099 Hamburg (DE).
- (71) Applicant (for all designated States except DE, US): KONINKLIJKE PHILIPS ELECTRONICS N. V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): RITTER, Hans-Martin [DE/DE]; c/o Philips Intellectual Property & Standards GmbH, Weisshausstr. 2, 52066 Aachen (DE). LÜBBE, Martin [DE/DE]; c/o Philips Intellectual Property & Standards GmbH, Weisshausstr. 2, 52066 Aachen (DE). WYNANTS, Jochen [NL/DE]; c/o Philips

Intellectual Property & Standards GmbH, Weisshausstr. 2, 52066 Aachen (DE).

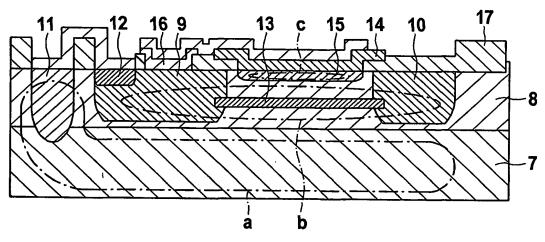
- (74) Agent: MEYER, Michael; Philips Intellectual Property & Standards GmbH, Weisshausstr. 2, 52066 Aachen (DE).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

## Published:

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PUNCH-THROUGH DIODE AND METHOD OF PROCESSING THE SAME



(57) Abstract: A monolithically integrated punch-through diode with a Schottky-like behavior. This is achieved as a Schottky-metal area (16) is deposited onto at least part of the first p-doped well's (9) surface. The Schottky-metal area (16) and the p-doped well (9) form the metal-semiconductor-transition of a Schottky-diode. The overvoltage protection of the inventive PT-diode is improved as the forward characteristic has a voltage drop that is less than 0.5V.